

# **Algorithms for Intelligent Systems**

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Hari Mohan Dubey · Manjaree Pandit ·  
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# Artificial Intelligence and Sustainable Computing

Proceedings of ICSISCET 2020

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# Preface

During the COVID times, organizing an International conference has been quite challenging. Conventionally, conferences are meant to serve as platforms for meeting people, for exchanging ideas, for collaborating and getting inspiration through face to face communication!!

Organizing this virtual conference was a completely new experience. But with the support from our charismatic patrons, eminent experts, enthusiastic participants, diligent faculty, staff & research scholars of the institute, finally experts around the world, authors and faculty and scholars of the host institute were connected electronically in the virtual domain, for the Inaugural and 14 other Sessions of the two-day AICTE, India & TEQIP-III sponsored *Second International Conference on “Sustainable and Innovative Solutions for Current Challenges in Engineering & Technology”*.

The concept of sustainability is central to all development; the term becomes more relevant by each passing day as the very existence of life on this planet is endangered due to the continuous and mindless exploitation of nature and natural resources due to population explosion, economic growth, infrastructure development, lifestyle changes and many other such factors.

There is an urgent need to develop technologies that are sustainable. There is a need for experts from different domains to join hands, come together and create models and systems which are able to produce sustainable solutions to current and emerging problems for the benefit of the society. Innovations and advancements which have taken place in intelligent computing paradigm over the last few decades have provided smart solutions for almost all kinds of societal problems. Therefore, the focus of this conference is towards interdisciplinary applications of Intelligent and sustainable computing.

Most practical real world problems are usually ill defined, noisy, uncertain and complex which make them difficult to solve using traditional computational techniques and algorithms. Computational intelligence based techniques are found to deal with real problems and situations very effectively due to their model free structure, learning ability and a flexible approach. The interdisciplinary applicability of this paradigm makes it very attractive to researchers.

Right from infrastructure management to data mining, ICT, pattern recognition, image & video processing, healthcare informatics, bioinformatics, renewable energy pricing, scheduling and dispatch, internet of things, big data analysis, real-time operating systems, smart homes and devices, electric vehicles, computer integrated manufacturing, biomedical engineering etc. are domains where machine learning techniques and computational intelligence are extensively being used for designing, developing, manufacturing, controlling, analysing and optimizing diverse engineering systems and processes.

Technology is progressing at a very fast pace, which is putting a great burden on natural resources, creating heavy damage to the environment. The price of development is being paid in the form of climate change, hazardous pollution levels and degradation of the environment, which is endangering the very existence of life of the planet earth. There is a need for technocrats, academicians, researchers and all other stakeholders to come together and deliberate on this issue and try to find intelligent solutions to the problem. Scientific discoveries and technological innovations taking place for fulfilling the requirements of the power and energy sector, manufacturing sector, transportation, industrial automation, waste disposal etc. now must pointedly focus on the ecological footprint. *Madhav Institute of technology & Science, Gwalior is committed to this theme and therefore this is the second international conference being organized in this series.*

The first AICTE sponsored ICSISCET-2019 was conducted last year on 02–03 November 2019. Over 148 papers were received, 88 papers were accepted after rigorous review for presentation under 10 tracks; 16 sessions were conducted; 10 expert sessions were conducted; 24 experts contributed as sessions chairs and over 100 faculty and scholars participated. *As an environment friendly initiative and the sustainability theme, the best practice of giving e-certificates was started in the institute.*

The conference proceeding with 51 papers was published by Springer {Proceedings in Adaptation Learning and Optimization (PALO) series} entitled *Intelligent Computing Applications for Sustainable Real-World Applications*.

One edited volume was also published with 09 papers selected in the domain *Nature Inspired Optimization for Electrical Power System* by Springer series Algorithms for Intelligent Systems (AIS). Both these books have been very well received by the researchers and show more than 5600 and 1500 downloads respectively (within six months of publication) till this report is being compiled.

In this Second ICSISCET-2020:

- Over 102 papers were received; 69 papers were accepted after rigorous review for presentation under 4 tracks; 38 were selected for publication; 08 expert sessions were conducted; Six paper presentation sessions were held; 18 experts contributed as sessions chairs.
- Single blind review was carried out with minimum 2 and maximum 3 reviewers. The authors were asked to submit the marked copy of revised paper to highlight the changes incorporated on account of reviewer's suggestions.

- The selected papers from the conference will be published in the Springer Book Series Algorithms for Intelligent systems (AIS), entitled *Artificial Intelligence and Sustainable Computing—Proceedings of ICSISCET 2020*. (<https://www.springer.com/series/16171>).

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The organizers also acknowledge cooperation of the *Delhi Technological University (DTU), Delhi, India*, under the twinning arrangement in TEQIP-III.

The *conference patron Prof. K. K. Aggarwal, Chairman NBA*, was the guiding force behind the conference. He also kindly accepted to deliver the keynote address, for which the organizers are eternally indebted.

*Dr. P. N. Suganthan of Nanyang Technological University, Singapore, Dr. Anuradha Ranasinghe of Liverpool Hope University, United Kingdom, Dr. Swagatam Das of Indian Statistical Institute, Kolkata, West Bengal, India, Dr. Carlos A. Coello Coello of CINVESTAV-IPN, Mexico, Dr. R. V. Rao of NIT, Surat, Gujrat, India, Dr. Sumantra Dutta Roy of IIT, Delhi, India, Dr. J. C. Bansal of South Asian University, New Delhi, India, and Dr. B. K. Panigrahi of IIT, Delhi, India* deserve a special mention for sparing their valuable time for delivering the *Technical Sessions*.

The organizers are grateful for the constant inputs and support from our Conference Chairs *Prof. R. V. Rao of NIT, Surat, India Dr. J. C. Bansal of South Asian University, New Delhi*, and *Dr. Mukhtiar Singh of DTU, Delhi, India*. Without their support the conference could not have been conducted at this scale.

*Mr. Aninda Bose and Mr. Radhakrishnan*, Editors from Springer Nature, deserves special thanks for helping and guiding the organizers throughout this journey which will culminate in publishing of the proceedings.

The organizing team is grateful to *Mr. Prashant Mehta, IAS & Former Director General of the Academy of Administration, Bhopal, India* for sparing time to inaugurate the conference.

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Thanks are also due to all the *esteemed reviewers* for their time and significant contribution in maintaining the quality of the papers.

The contribution of *internal and external experts* as *Session Chairs* and the *Session Support Teams* during the two days was crucial for the effective conduction of the conference. They played a key role in conference conduction by giving valuable comments for improving the quality of the paper and by ensuring that all reviewer comments were incorporated into the revised papers, before publication. The organizers are grateful for their support and efforts in conference conduction.

During the COVID times, organizing an International conference in virtual mode was quite challenging. The hard work and efforts of the *Conference Core Team*, *Dr. Pratesh Jayaswal, Dr. Vijay Bhuria, Dr. R. R. Singh, Mr. Atul Chauhan, Mr. Nikhil Paliwal, Ms. Poonam Singh, Ms. Hemlata Arya, Mr. Arun Rana, Ms. Aishwarya, Mr. Rajesh Sharma and Mr. Vinod Sharma* is sincerely acknowledged. The members have worked relentlessly and have left no stone unturned to make the e-conference a reality.

Thanks are also due to media persons, guests, authors and all those who have directly or indirectly contributed in organizing and conducting this conference.

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# A Wavelet-Based Segmentation Technique for Medical Images

[Rinisha Bagaria](#) , [Sulochana Wadhvani](#) & [A. K. Wadhvani](#)

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## Abstract

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In order to extract any abnormality in the given image, the first step is to segment it so that detailed information can be identified clearly. This paper describes the wavelet-based segmentation method for segmentation of medical images, particularly X-ray images, to locate any fracture in the bones. Of the images considered in this study, the third level of decomposition of Haar wavelet is found most